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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,604	06/17/2005	Peter Schoubye	H0610.0384/P384	4765
24998	7590	03/25/2008	EXAMINER	
DICKSTEIN SHAPIRO LLP			WU, IVES J	
1825 EYE STREET NW			ART UNIT	
Washington, DC 20006-5403			PAPER NUMBER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,604	Applicant(s) SCHOUBYE ET AL.	
	Examiner IVES WU	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/16/2005;06/17/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

- (1). Claim 2 is objected to because of the following informalities:

In claim 2, it recites: “a wet electrostatic separator us used in place of an aerosol filter”. It should be : --a wet electrostatic separator is used in place of an aerosol filter--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

- (2). **Claims 1-3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Muceniaks (GB1499536) in view of Diep (US04678481) and Schoubye (US05108731A), as evidenced by Thirion (US03953578).

As to a process for removal of SO₂ in off-gas having containing 0.001 – 1 vol% SO₂ in which the SO₂ is oxidized to H₂SO₄ by spraying an aqueous solution of H₂O₂ into the off-gas upstream in **independent claim 1**, Muceniaks (GB1499536) discloses method of the removal of sulfur-containing gases present in a waste gas stream before the gases are released into the atmosphere (page 1, line 11-14). For example, sulfur-containing gases are present in effluent gas streams from flue gases, smelter gases, off-gases from chemical and petroleum processes (page 1, line 17-21). It comprises contacting the waste gas stream with an aqueous hydrogen peroxide solution at a temperature above the freezing point but below the boiling point of the solution for a sufficient time to simultaneously absorb and oxidize the sulfur-containing gas (page 1, line 66-

74). Generally, the sulfur-containing gas concentration is source-dependent and varies from a few mg/l to several percent (page 2, line 19-24). As demonstrated in Example 1, the gas stream containing 0.1% SO₂ by volume, which reads on the limitation of SO₂ concentration in instant claim. The waste gas stream is contacted with the aqueous hydrogen peroxide solution in any conventional contacting device (page 3, line 65 – 67), therefore, it would be obvious to have spraying device for the contact. It is well known in the art the SO₂ and H₂O₂ will result in H₂SO₄ in the contact.

As to off-gas having a temperature of 30 – 150 °C in **independent claim 1**, Mucenicks (GB1499536) **does not teach** the temperature of off-gas as claimed.

However, Diep (US04678481) **teaches** gas temperature at the scrubber inlet to be from 300 to 400 °F (Col. 2, line 22-23).

The advantage of this temperature range is the peroxide effectively and efficiently converting the SO₂ to SO₃ (Col. 1, line 41-43).

Therefore, it would have been obvious at time of the invention to use the off-gas of temperature range disclosed by Diep for the gas stream input of Mucenicks in order to attain the advantage cited above.

As to an aerosol filter removing the produced sulfuric acid from off-gas in **independent claim 1**, Mucenicks (GB1499536) discloses to discharge directly into the environment (page 3, line 74-75). Mucenicks **does not teach** the aerosol filter downstream as claimed.

However, Schoubye (US05108731A) **teaches** filter in the sulfuric acid process (Abstract). As evidenced by Thirion (US03953578) that sulfuric aerosol is produced in the gaseous phase by the action of sulfuric anhydride on hydrogen peroxide vapour (Col. 4, line 62-64), furthermore, the reaction of SO₂ liquid + H₂O₂ liquid -> H₂SO₄ dilute in droplet (Col. 4, line 52).

The advantage of using filter is to reduce the amount of acid mist escaping to environment to meet the continually increasing demands on environmental regulations and the sulfuric acid recovered is highly pure and highly concentrated (Abstract, line 8-10, 21-22).

Therefore, it would have been obvious at time of the invention to install the filter of Schoubye before the gaseous stream discharged into the environment as disclosed by Mucenicks.

As to the off-gas to be cooled by evaporation of the water comprised in the solution being sprayed into the off-gas upstream of the filter in **claim 2**, in view of substantially identical process disclosed by prior arts and by applicants, the cooling effect would occur in the process of prior arts.

As to a wet electrostatic separator in place of an aerosol filter in **claim 3**, Diep (US04678481) discloses a method of improving the efficiency of electrostatic precipitators for removing high resistivity particulate matter from flue gases by treating flue gases prior to contact with the electrostatic precipitator with an aqueous solution of hydrogen peroxide (Abstract).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

Art Unit: 1797

Date: March 15, 2008

/Duane S. Smith/
Supervisory Patent Examiner, Art Unit 1797
3-20-08